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| 10/020,228 | 12/18/2001 | Takayuki Shimamune | 9358 | 5697 |

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EXAMINER

PADGETT, MARIANNE L

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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1762

DATE MAILED: 10/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/020,228

Applicant(s)

Shimamura et al

Examiner

M.L. Padgett

Group Art Unit

1762

— The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address —

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- ☐ Responsive to communication(s) filed on 6/25/03 & 12/18/01
- ☐ This action is FINAL.
- ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- ☒ Claim(s) 1-14 is/are pending in the application.
- Of the above claim(s) 13-14 is/are withdrawn from consideration.
- ☐ Claim(s) is/are allowed.
- ☒ Claim(s) 1-12 is/are rejected.
- ☐ Claim(s) is/are objected to.
- ☐ Claim(s) are subject to restriction or election requirement

Application Papers

- ☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.
- ☐ The drawing(s) filed on _____ is/are objected to by the Examiner
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

- ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).
- ☐ All ☐ Some* ☐ None of the:
 - ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a))

*Certified copies not received: _____

Attachment(s)

- ☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 2
- ☐ Interview Summary, PTO-413
- ☒ Notice of Reference(s) Cited, PTO-892
- ☐ Notice of Informal Patent Application, PTO-152
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Other _____

Office Action Summary

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1. Applicant's election without traverse of Group 1, method claims 1-12 in Paper No. 4 are acknowledged.

2. It is noted that the term "near infrared" or NIR is defined on page 2, line 35 of the specification as having wavelength from "about 780 to about 2500 nm". Halogen lamps are noted therein to be a means of producing such, however no specific devices were disclosed therefore (an untranslated German reference & a German company were referenced, which provides no usable information in English).

Note that given the above definition, claim 12 is identical to claim 1, except that 12 lacks the time limitation for the irradiating; i.e. as $NIR = \lambda$ from about 780 nm to about 2500 nm, claim 1 inherently contains this range limitation explicitly set forth in 12.

Also, for the radiation usage as claimed, while NIR must be used, also using of other radiation outside the NIR range is NOT excluded.

3. Claims 1-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Use of relative terms lacking clear metes and bounds in the claim or in a definition in specification or cited relevant to prior art, is vague and indefinite. In the claims, see "protective" describing "coatings." Protective against what? Temperature extremes, wear, corrosion, etc.? A coating of no specific material that protects against unspecified conditions or substances or environments has very unclear metes and bounds.

The Markush group of claim 4 uses improper Markush language, i.e., open terminology "...comprising at least..." instead of the proper --selected from the group consisting of...--

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In claim 5, "deactivated" with respect to what, or how? Does this claim say that the "conductive electrode" does not really need to be conductive, thus contradicting the requirements of the independent claim or what is actually intended?

In claims 10 and 11, the last 4 words "irradiated...substrate" make no sense with the rest of the sentence. Are there words missing or are these words extra or redundant?

Claim 8 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. As noted above in section 2, NIR inherently includes the limitation of this wavelength range, hence claim 8 add no further limitation to the independent claim.

With respect to the independent claims limitation "a conductive electrode substrate," does this mean that the substrate is the electrode, or does it mean that it is used for deposition thereof and that the electrocatalytic coating being deposited may actually be the electrode not just a coating applied on the electrode? As presently written either option will be considered as a possible meaning.

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly

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owned at the time any inventions covered therein were made absent any evidence to the contrary.

Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claim 12 is rejected under 35 U.S.C. 102(b) as being clearly anticipated by Tanaka et al (English abstract to JP 60243280 A, supplied by applicant; patent by PTO).

Tanaka et al teach forming a transparent conductive electrode on a glass substrate, hence on a "conductive substrate" within the scope of the claim (see above discussion). The process deposits a metal-organic solution on the substrate which is first UV treated, then irradiated with near IR (NIR) for 20 minutes in air to heat to 500°C, after which the temperature is decreased, thus producing the electrode layer thereon which is considered to read on the "electrocatalytic" coating. Note that the Tanaka et al use of In and Sn containing precursors is consistent with reagents used and taught by applicant, and as it is treated as claimed, like materials would inherently have been deposited.

6. Tanaka et al (JP 60243279 A) is equivalent to (280 A) discussed above, for the claims as written.

7. Claims 1-2, 5, 8-9 and 12 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Sakai et al.

In Sakai et al, see the abstract; figures; and paragraphs [0048], [0053-0055], [0071], [0077-0078] for application of a paste comprising an organometallic (gold) compound, onto a substrate with a conductive electrode, such as ITO, where a semiconductor laser with near-infrared rays of wavelength of approximately 810 nm, is used to bake and irradiate the paste in order to produce a thin metallic film that can repair defective (broken) parts of the electrode. The timing for the laser heating process is illustrated

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in Fig. 4, with description on [0057-0058], for a total time exemplified by 42 second (i.e. less than a minute). The heating period includes time for dissipating (i.e. evaporating) solvent from the paste.

8. Claims 4 and 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakai et al as applied above in section 7.

While Sakai et al do not teach a precursor material with the metals listed in claim 4, the taught organogold compounds are homologous in use and chemistry with other noble metal compounds, such as those employing Pt or Pd, hence it would have been obvious to one of ordinary skill in the art to use such homologous compounds, whose metals are known for use for electrode and catalytic purposes, due to the expectation of equivalent effects in process and function.

While Sakai et al does not discuss use of aqueous as organic solvents in their pastes (i.e. thick solutions), they do explicitly mention the presence of solvents, and it would have been obvious to one of ordinary skill in the art to employ either claimed type of solvent, depending on particular organometallic compound employed, and its solubility.

9. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sakai et al as applied to claims 1-2, 4-9 and 12 above, and further in view of Nishiki et al (5,035,779).

Sakai et al does not discuss multiple coatings by the claimed/taught coating technique, however Nishiki et al who is also providing coatings for electrodes, using noble metals specified to be Pt group, applied in solutions of water, alcohol and acid (i.e. both aqueous and organic solvents used), where heat decomposition may use IR heaters (abstract; column 4, lines 16-60+; and Ex. 7 in column 11), teach multiple layers (column 6, lines 60-62; and column 11, lines 40-46 in example 7). Therefore, it would have been obvious to one of ordinary skill in the art that multiple layers would have been advantageously deposited via the technique of Sakai et al, because analogously structured and treated electrode materials have been shown to include multiple layers of materials. Note Nishiki et al is also cumulative for obviousness of claimed solvents and alternative metals from the Au taught in Sakai et al.

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10. Claims 1-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Flicstein et al, in view of Nishiki et al or Busse et al.

Flicstein et al teach photochemical treatment of process materials, which may be liquid (or gas or solid), and include organometallic, to form dielectric, metallic or semiconductor material. The film(s) are formed using pulsed glow discharge lamps with an extension emission spectrum between 160 to 5000 nm, which is totally inclusive of applicant's claimed NIR range. As use of wavelengths outside the claimed wavelengths is not excluded, the exposure technique of Flicstein et al is consistent with the claims as written. The disclosed fields of use include microelectronics and integrated optics, which while not specifically teaching the claimed conductive electrode substrate configuration, is inclusive thereof. See the abstract; column 1, lines 5-14; column 3, line 45- column 4, line 68; column 5, lines 51-59; column 6, lines 39-52; column 7, lines 38-68+; column 9; etc. Also note, column 5, line 60 to column 6, line 5 suggest multiple film deposition, and repeated alternation to form stacked coatings. Various parameters concerning voltage, power, current and lamp intensity are discussed, but specifics for power density at the substrate surface are not specified, nor can be directly derived from the given values, but it would have been obvious to one of ordinary skill to optimize the power density at the surface, according to the specific materials being reacted, where the lamps employed would have been expected to be inclusive of values claimed.

While Flicstein et al does not propose the specifically claimed configuration, either Nishiki et al (discussed in section 9) or Busse et al (abstract; figures; column 1, lines 4-8; summary; column 2, lines 48-58; column 3, line 45- column 4, line 9; and Ex. 1, in column 5) teach claimed coated electrode structures, where the coating solutions employed therefore may be heat treated with IR techniques (ovens) with no specific wavelength ranges required, hence it would have been obvious to one of ordinary skill, that the specific configurations, products and types of precursors in Nishiki et al or Busse et al, would have been expected to be effectively treated by Flicstein et al's process, as they are specific examples of

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Flicstein et al's generic teachings, and all references are inclusive of IR usage, with secondary non-specific, but the primary explicitly including the NIR portion of the spectra, and comparing their techniques as superior to prior art using only IR heating (column 2, lines 58-68).

11. Other art of interest includes Miyazawa (not prior art), who includes teachings of treating applied coatings on transparent substrates with NIR laser light on the order of 800 nm [0154-0155+], and is making electro-optic and electronic equipment.

12. Any inquiry concerning this communication from the examiner should be directed to M. L. Padgett whose telephone number is (703) 308-2336. The examiner can generally be reached on Monday-Friday from about 8:30 a.m. to 4:30 p.m.; and fax phone numbers are (703) 872-9306 (Official); and (703) 305-6078 (unofficial).

M.L. Padgett/dh 9/5/03
October 2, 2003



MARIANNE PADGETT
PRIMARY EXAMINER